



Full wwPDB X-ray Structure Validation Report ⓘ

Jul 28, 2025 – 10:14 am BST

PDB ID : 7PGO / pdb_00007pgo
Title : OXA-48_R250A with carbamylated Lys73 with bromide ions bound at neutral pH
Authors : Zhou, Q.; He, Y.; Jin, Y.
Deposited on : 2021-08-15
Resolution : 1.85 Å(reported)

This is a Full wwPDB X-ray Structure Validation Report for a publicly released PDB entry.

We welcome your comments at validation@mail.wwpdb.org

A user guide is available at

<https://www.wwpdb.org/validation/2017/XrayValidationReportHelp>

with specific help available everywhere you see the ⓘ symbol.

The types of validation reports are described at

<http://www.wwpdb.org/validation/2017/FAQs#types>.

The following versions of software and data (see [references ⓘ](#)) were used in the production of this report:

MolProbity : 4-5-2 with Phenix2.0rc1
Mogul : 1.8.4, CSD as541be (2020)
Xtriage (Phenix) : 2.0rc1
EDS : 3.0
Percentile statistics : 20231227.v01 (using entries in the PDB archive December 27th 2023)
CCP4 : 9.0.006 (Gargrove)
Density-Fitness : 1.0.12
Ideal geometry (proteins) : Engh & Huber (2001)
Ideal geometry (DNA, RNA) : Parkinson et al. (1996)
Validation Pipeline (wwPDB-VP) : 2.45.1

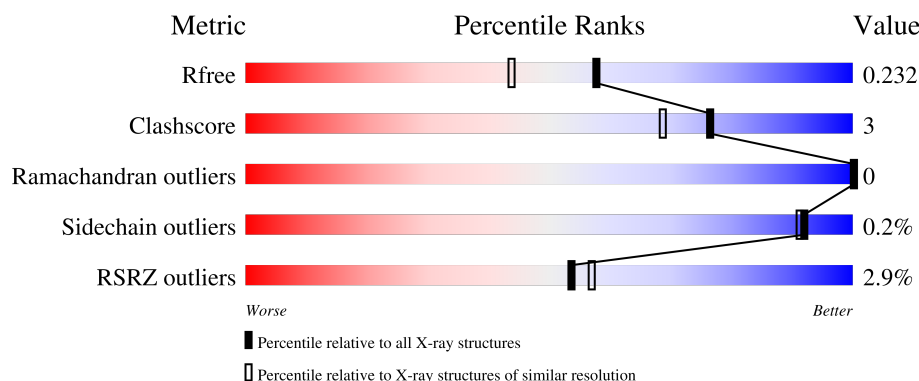
1 Overall quality at a glance

The following experimental techniques were used to determine the structure:

X-RAY DIFFRACTION

The reported resolution of this entry is 1.85 Å.

Percentile scores (ranging between 0-100) for global validation metrics of the entry are shown in the following graphic. The table shows the number of entries on which the scores are based.



Metric	Whole archive (#Entries)	Similar resolution (#Entries, resolution range(Å))
R_{free}	164625	3097 (1.86-1.86)
Clashscore	180529	3359 (1.86-1.86)
Ramachandran outliers	177936	3335 (1.86-1.86)
Sidechain outliers	177891	3335 (1.86-1.86)
RSRZ outliers	164620	3097 (1.86-1.86)

The table below summarises the geometric issues observed across the polymeric chains and their fit to the electron density. The red, orange, yellow and green segments of the lower bar indicate the fraction of residues that contain outliers for ≥ 3 , 2, 1 and 0 types of geometric quality criteria respectively. A grey segment represents the fraction of residues that are not modelled. The numeric value for each fraction is indicated below the corresponding segment, with a dot representing fractions $\leq 5\%$. The upper red bar (where present) indicates the fraction of residues that have poor fit to the electron density. The numeric value is given above the bar.

Mol	Chain	Length	Quality of chain
1	AAA	260	0% 89% 5% 6%
1	BBB	260	2% 87% 7% 6%
1	CCC	260	4% 88% 5% 7%
1	DDD	260	5% 88% 6% 6%

The following table lists non-polymeric compounds, carbohydrate monomers and non-standard

residues in protein, DNA, RNA chains that are outliers for geometric or electron-density-fit criteria:

Mol	Type	Chain	Res	Chirality	Geometry	Clashes	Electron density
3	BR	AAA	304[A]	-	-	X	-
3	BR	BBB	303[A]	-	-	X	-
3	BR	BBB	303[B]	-	-	X	-

2 Entry composition

There are 4 unique types of molecules in this entry. The entry contains 16884 atoms, of which 7929 are hydrogens and 0 are deuteriums.

In the tables below, the ZeroOcc column contains the number of atoms modelled with zero occupancy, the AltConf column contains the number of residues with at least one atom in alternate conformation and the Trace column contains the number of residues modelled with at most 2 atoms.

- Molecule 1 is a protein called Beta-lactamase.

Mol	Chain	Residues	Atoms						ZeroOcc	AltConf	Trace
1	AAA	244	Total	C	H	N	O	S	50	4	0
			3978	1278	1973	350	370	7			
1	BBB	244	Total	C	H	N	O	S	48	4	0
			3992	1282	1981	352	368	9			
1	CCC	243	Total	C	H	N	O	S	50	4	0
			3988	1282	1977	353	369	7			
1	DDD	244	Total	C	H	N	O	S	48	2	0
			3957	1273	1958	349	370	7			

There are 72 discrepancies between the modelled and reference sequences:

Chain	Residue	Modelled	Actual	Comment	Reference
AAA	6	MET	-	initiating methionine	UNP Q6XEC0
AAA	7	HIS	-	expression tag	UNP Q6XEC0
AAA	8	HIS	-	expression tag	UNP Q6XEC0
AAA	9	HIS	-	expression tag	UNP Q6XEC0
AAA	10	HIS	-	expression tag	UNP Q6XEC0
AAA	11	HIS	-	expression tag	UNP Q6XEC0
AAA	12	HIS	-	expression tag	UNP Q6XEC0
AAA	13	SER	-	expression tag	UNP Q6XEC0
AAA	14	ALA	-	expression tag	UNP Q6XEC0
AAA	15	GLY	-	expression tag	UNP Q6XEC0
AAA	16	GLU	-	expression tag	UNP Q6XEC0
AAA	17	ASN	-	expression tag	UNP Q6XEC0
AAA	18	LEU	-	expression tag	UNP Q6XEC0
AAA	19	TYR	-	expression tag	UNP Q6XEC0
AAA	20	PHE	-	expression tag	UNP Q6XEC0
AAA	21	GLN	-	expression tag	UNP Q6XEC0
AAA	22	GLY	-	expression tag	UNP Q6XEC0
AAA	250	ALA	ARG	engineered mutation	UNP Q6XEC0
BBB	6	MET	-	initiating methionine	UNP Q6XEC0
BBB	7	HIS	-	expression tag	UNP Q6XEC0
BBB	8	HIS	-	expression tag	UNP Q6XEC0

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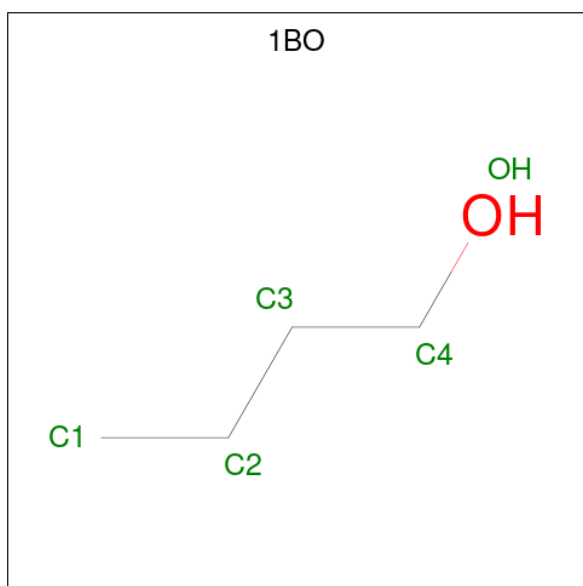
Chain	Residue	Modelled	Actual	Comment	Reference
BBB	9	HIS	-	expression tag	UNP Q6XEC0
BBB	10	HIS	-	expression tag	UNP Q6XEC0
BBB	11	HIS	-	expression tag	UNP Q6XEC0
BBB	12	HIS	-	expression tag	UNP Q6XEC0
BBB	13	SER	-	expression tag	UNP Q6XEC0
BBB	14	ALA	-	expression tag	UNP Q6XEC0
BBB	15	GLY	-	expression tag	UNP Q6XEC0
BBB	16	GLU	-	expression tag	UNP Q6XEC0
BBB	17	ASN	-	expression tag	UNP Q6XEC0
BBB	18	LEU	-	expression tag	UNP Q6XEC0
BBB	19	TYR	-	expression tag	UNP Q6XEC0
BBB	20	PHE	-	expression tag	UNP Q6XEC0
BBB	21	GLN	-	expression tag	UNP Q6XEC0
BBB	22	GLY	-	expression tag	UNP Q6XEC0
BBB	250	ALA	ARG	engineered mutation	UNP Q6XEC0
CCC	6	MET	-	initiating methionine	UNP Q6XEC0
CCC	7	HIS	-	expression tag	UNP Q6XEC0
CCC	8	HIS	-	expression tag	UNP Q6XEC0
CCC	9	HIS	-	expression tag	UNP Q6XEC0
CCC	10	HIS	-	expression tag	UNP Q6XEC0
CCC	11	HIS	-	expression tag	UNP Q6XEC0
CCC	12	HIS	-	expression tag	UNP Q6XEC0
CCC	13	SER	-	expression tag	UNP Q6XEC0
CCC	14	ALA	-	expression tag	UNP Q6XEC0
CCC	15	GLY	-	expression tag	UNP Q6XEC0
CCC	16	GLU	-	expression tag	UNP Q6XEC0
CCC	17	ASN	-	expression tag	UNP Q6XEC0
CCC	18	LEU	-	expression tag	UNP Q6XEC0
CCC	19	TYR	-	expression tag	UNP Q6XEC0
CCC	20	PHE	-	expression tag	UNP Q6XEC0
CCC	21	GLN	-	expression tag	UNP Q6XEC0
CCC	22	GLY	-	expression tag	UNP Q6XEC0
CCC	250	ALA	ARG	engineered mutation	UNP Q6XEC0
DDD	6	MET	-	initiating methionine	UNP Q6XEC0
DDD	7	HIS	-	expression tag	UNP Q6XEC0
DDD	8	HIS	-	expression tag	UNP Q6XEC0
DDD	9	HIS	-	expression tag	UNP Q6XEC0
DDD	10	HIS	-	expression tag	UNP Q6XEC0
DDD	11	HIS	-	expression tag	UNP Q6XEC0
DDD	12	HIS	-	expression tag	UNP Q6XEC0
DDD	13	SER	-	expression tag	UNP Q6XEC0
DDD	14	ALA	-	expression tag	UNP Q6XEC0

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Chain	Residue	Modelled	Actual	Comment	Reference
DDD	15	GLY	-	expression tag	UNP Q6XEC0
DDD	16	GLU	-	expression tag	UNP Q6XEC0
DDD	17	ASN	-	expression tag	UNP Q6XEC0
DDD	18	LEU	-	expression tag	UNP Q6XEC0
DDD	19	TYR	-	expression tag	UNP Q6XEC0
DDD	20	PHE	-	expression tag	UNP Q6XEC0
DDD	21	GLN	-	expression tag	UNP Q6XEC0
DDD	22	GLY	-	expression tag	UNP Q6XEC0
DDD	250	ALA	ARG	engineered mutation	UNP Q6XEC0

- Molecule 2 is 1-BUTANOL (CCD ID: 1BO) (formula: C₄H₁₀O).



Mol	Chain	Residues	Atoms				ZeroOcc	AltConf
2	AAA	1	Total	C	H	O	0	0
			15	4	10	1		
2	AAA	1	Total	C	H	O	0	0
			15	4	10	1		
2	BBB	1	Total	C	H	O	0	0
			15	4	10	1		
2	DDD	1	Total	C	H	O	0	0
			15	4	10	1		

- Molecule 3 is BROMIDE ION (CCD ID: BR) (formula: Br).

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
3	AAA	2	Total 3	Br 3	0	1
3	BBB	3	Total 4	Br 4	0	1

- Molecule 4 is water.

Mol	Chain	Residues	Atoms		ZeroOcc	AltConf
4	AAA	227	Total 227	O 227	0	0
4	BBB	249	Total 249	O 249	0	0
4	CCC	224	Total 224	O 224	0	0
4	DDD	201	Total 202	O 202	0	1

3 Residue-property plots [i](#)

These plots are drawn for all protein, RNA, DNA and oligosaccharide chains in the entry. The first graphic for a chain summarises the proportions of the various outlier classes displayed in the second graphic. The second graphic shows the sequence view annotated by issues in geometry and electron density. Residues are color-coded according to the number of geometric quality criteria for which they contain at least one outlier: green = 0, yellow = 1, orange = 2 and red = 3 or more. A red dot above a residue indicates a poor fit to the electron density ($RSRZ > 2$). Stretches of 2 or more consecutive residues without any outlier are shown as a green connector. Residues present in the sample, but not in the model, are shown in grey.

- Molecule 1: Beta-lactamase

Chain AAA: 

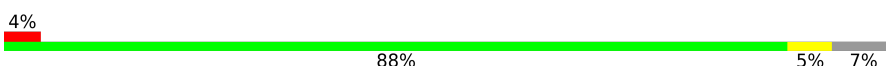


- Molecule 1: Beta-lactamase

Chain BBB: 



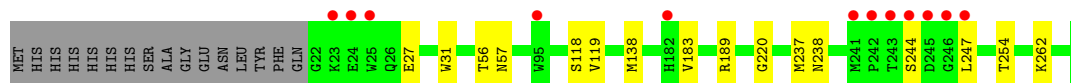
- Molecule 1: Beta-lactamase

Chain CCC: 



- Molecule 1: Beta-lactamase

Chain DDD: 



4 Data and refinement statistics

Property	Value	Source
Space group	P 21 21 21	Depositor
Cell constants a, b, c, α , β , γ	84.55Å 108.20Å 124.61Å 90.00° 90.00° 90.00°	Depositor
Resolution (Å)	58.75 – 1.85 58.75 – 1.85	Depositor EDS
% Data completeness (in resolution range)	99.9 (58.75-1.85) 99.9 (58.75-1.85)	Depositor EDS
R_{merge}	(Not available)	Depositor
R_{sym}	(Not available)	Depositor
$\langle I/\sigma(I) \rangle$ ¹	1.86 (at 1.86Å)	Xtriage
Refinement program	REFMAC 5.8.0267	Depositor
R, R_{free}	0.205 , 0.234 0.201 , 0.232	Depositor DCC
R_{free} test set	5024 reflections (5.12%)	wwPDB-VP
Wilson B-factor (Å ²)	16.2	Xtriage
Anisotropy	0.890	Xtriage
Bulk solvent k_{sol} (e/Å ³), B_{sol} (Å ²)	0.44 , 47.8	EDS
L-test for twinning ²	$\langle L \rangle = 0.49$, $\langle L^2 \rangle = 0.33$	Xtriage
Estimated twinning fraction	No twinning to report.	Xtriage
F_o, F_c correlation	0.96	EDS
Total number of atoms	16884	wwPDB-VP
Average B, all atoms (Å ²)	22.0	wwPDB-VP

Xtriage's analysis on translational NCS is as follows: *The analyses of the Patterson function reveals a significant off-origin peak that is 49.63 % of the origin peak, indicating pseudo-translational symmetry. The chance of finding a peak of this or larger height randomly in a structure without pseudo-translational symmetry is equal to 7.2588e-05. The detected translational NCS is most likely also responsible for the elevated intensity ratio.*

¹Intensities estimated from amplitudes.

²Theoretical values of $\langle |L| \rangle$, $\langle L^2 \rangle$ for acentric reflections are 0.5, 0.333 respectively for untwinned datasets, and 0.375, 0.2 for perfectly twinned datasets.

5 Model quality [i](#)

5.1 Standard geometry [i](#)

Bond lengths and bond angles in the following residue types are not validated in this section: 1BO, BR, KCX

The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 5$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Chain	Bond lengths		Bond angles	
		RMSZ	$\# Z > 5$	RMSZ	$\# Z > 5$
1	AAA	0.99	0/2053	1.21	0/2774
1	BBB	0.98	0/2059	1.20	0/2782
1	CCC	0.99	0/2057	1.18	0/2780
1	DDD	1.01	0/2041	1.21	2/2759 (0.1%)
All	All	0.99	0/8210	1.20	2/11095 (0.0%)

There are no bond length outliers.

All (2) bond angle outliers are listed below:

Mol	Chain	Res	Type	Atoms	Z	Observed(°)	Ideal(°)
1	DDD	119	VAL	CA-C-N	5.01	124.34	120.33
1	DDD	119	VAL	C-N-CA	5.01	124.34	120.33

There are no chirality outliers.

There are no planarity outliers.

5.2 Too-close contacts [i](#)

In the following table, the Non-H and H(model) columns list the number of non-hydrogen atoms and hydrogen atoms in the chain respectively. The H(added) column lists the number of hydrogen atoms added and optimized by MolProbity. The Clashes column lists the number of clashes within the asymmetric unit, whereas Symm-Clashes lists symmetry-related clashes.

Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
1	AAA	2005	1973	1968	10	0
1	BBB	2011	1981	1976	15	0
1	CCC	2011	1977	1968	8	0
1	DDD	1999	1958	1951	9	0
2	AAA	10	20	20	1	0

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Mol	Chain	Non-H	H(model)	H(added)	Clashes	Symm-Clashes
2	BBB	5	10	10	0	0
2	DDD	5	10	10	0	0
3	AAA	3	0	0	3	0
3	BBB	4	0	0	4	0
4	AAA	227	0	0	4	0
4	BBB	249	0	0	8	0
4	CCC	224	0	0	2	0
4	DDD	202	0	0	2	0
All	All	8955	7929	7903	44	0

The all-atom clashscore is defined as the number of clashes found per 1000 atoms (including hydrogen atoms). The all-atom clashscore for this structure is 3.

All (44) close contacts within the same asymmetric unit are listed below, sorted by their clash magnitude.

Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:BBB:241[B]:MET:SD	1:BBB:247:LEU:HD23	2.19	0.82
3:BBB:303[A]:BR:BR	4:BBB:624:HOH:O	2.60	0.74
3:AAA:304[A]:BR:BR	4:DDD:587:HOH:O	2.65	0.68
1:BBB:87:LYS:HG2	4:BBB:498:HOH:O	2.00	0.61
1:DDD:138:MET:HE1	1:DDD:183:VAL:CG1	2.31	0.60
1:CCC:244:SER:O	1:CCC:247:LEU:HG	2.03	0.59
1:DDD:244:SER:O	1:DDD:247:LEU:HG	2.03	0.58
1:BBB:107[B]:ARG:NH2	1:CCC:230:ASP:OD1	2.37	0.57
1:AAA:189:ARG:HD2	3:AAA:304[B]:BR:BR	2.60	0.57
3:BBB:303[B]:BR:BR	1:CCC:189:ARG:HD2	2.60	0.56
1:BBB:31:TRP:HB2	1:BBB:57:ASN:HB3	1.92	0.52
1:DDD:262:LYS:NZ	4:DDD:405:HOH:O	2.44	0.51
1:AAA:138:MET:HE1	4:AAA:405:HOH:O	2.11	0.51
1:DDD:220:GLY:O	1:DDD:238:ASN:HA	2.12	0.50
1:BBB:220:GLY:O	1:BBB:238:ASN:HA	2.12	0.49
1:DDD:237:MET:HG2	1:DDD:254:THR:OG1	2.13	0.49
3:AAA:304[A]:BR:BR	1:DDD:189:ARG:HD2	2.66	0.49
1:DDD:138:MET:HE1	1:DDD:183:VAL:HG13	1.93	0.49
1:AAA:220:GLY:O	1:AAA:238:ASN:HA	2.13	0.48
1:BBB:189:ARG:HD2	3:BBB:303[A]:BR:BR	2.68	0.48
1:BBB:40:SER:HB3	4:BBB:408:HOH:O	2.11	0.48
1:BBB:239:MET:HG3	1:BBB:241[B]:MET:HE3	1.95	0.48
1:AAA:31:TRP:HB2	1:AAA:57:ASN:HB3	1.95	0.48
1:CCC:220:GLY:O	1:CCC:238:ASN:HA	2.13	0.48
1:AAA:40:SER:HB3	4:AAA:469:HOH:O	2.13	0.47

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Atom-1	Atom-2	Interatomic distance (Å)	Clash overlap (Å)
1:AAA:87[B]:LYS:HA	1:AAA:87[B]:LYS:HD2	1.67	0.47
1:DDD:31:TRP:HB2	1:DDD:57:ASN:HB3	1.96	0.46
1:BBB:215:ILE:HD11	4:BBB:555:HOH:O	2.15	0.46
1:CCC:31:TRP:HB2	1:CCC:57:ASN:HB3	1.98	0.45
1:BBB:247:LEU:HD22	4:BBB:611:HOH:O	2.16	0.45
1:AAA:27:GLU:HA	1:AAA:56:THR:O	2.17	0.45
1:CCC:40:SER:HB3	4:CCC:303:HOH:O	2.17	0.43
1:BBB:27:GLU:HA	1:BBB:56:THR:O	2.18	0.43
1:AAA:138:MET:CE	4:AAA:405:HOH:O	2.65	0.43
1:BBB:115[A]:MET:HE3	1:BBB:115[A]:MET:HB2	1.86	0.43
1:CCC:27:GLU:HA	1:CCC:56:THR:O	2.19	0.42
1:AAA:174:ARG:HD3	2:AAA:301:1BO:H12	2.01	0.42
1:BBB:216:GLU:OE1	4:BBB:401:HOH:O	2.21	0.42
1:DDD:27:GLU:HA	1:DDD:56:THR:O	2.19	0.42
1:BBB:107[B]:ARG:NH2	4:BBB:416:HOH:O	2.53	0.42
1:CCC:237:MET:HG2	1:CCC:254:THR:OG1	2.20	0.42
1:AAA:137:LYS:NZ	4:AAA:415:HOH:O	2.53	0.41
1:BBB:230:ASP:OD2	4:BBB:402:HOH:O	2.22	0.41
3:BBB:303[B]:BR:BR	4:CCC:506:HOH:O	2.78	0.40

There are no symmetry-related clashes.

5.3 Torsion angles ⓘ

5.3.1 Protein backbone ⓘ

In the following table, the Percentiles column shows the percent Ramachandran outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the backbone conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Favoured	Allowed	Outliers	Percentiles	
1	AAA	245/260 (94%)	240 (98%)	5 (2%)	0	100	100
1	BBB	245/260 (94%)	239 (98%)	6 (2%)	0	100	100
1	CCC	243/260 (94%)	238 (98%)	5 (2%)	0	100	100
1	DDD	243/260 (94%)	238 (98%)	5 (2%)	0	100	100
All	All	976/1040 (94%)	955 (98%)	21 (2%)	0	100	100

There are no Ramachandran outliers to report.

5.3.2 Protein sidechains ⓘ

In the following table, the Percentiles column shows the percent sidechain outliers of the chain as a percentile score with respect to all X-ray entries followed by that with respect to entries of similar resolution.

The Analysed column shows the number of residues for which the sidechain conformation was analysed, and the total number of residues.

Mol	Chain	Analysed	Rotameric	Outliers	Percentiles	
1	AAA	214/224 (96%)	214 (100%)	0	100	100
1	BBB	214/224 (96%)	214 (100%)	0	100	100
1	CCC	214/224 (96%)	213 (100%)	1 (0%)	86	84
1	DDD	212/224 (95%)	211 (100%)	1 (0%)	86	84
All	All	854/896 (95%)	852 (100%)	2 (0%)	92	91

All (2) residues with a non-rotameric sidechain are listed below:

Mol	Chain	Res	Type
1	CCC	118	SER
1	DDD	118	SER

Sometimes sidechains can be flipped to improve hydrogen bonding and reduce clashes. There are no such sidechains identified.

5.3.3 RNA ⓘ

There are no RNA molecules in this entry.

5.4 Non-standard residues in protein, DNA, RNA chains ⓘ

4 non-standard protein/DNA/RNA residues are modelled in this entry.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
1	KCX	CCC	73	1	9,11,12	0.67	0	5,12,14	0.34	0
1	KCX	DDD	73	1	9,11,12	0.72	0	5,12,14	0.33	0
1	KCX	AAA	73	1	9,11,12	0.65	0	5,12,14	0.54	0
1	KCX	BBB	73	1	9,11,12	0.70	0	5,12,14	0.50	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
1	KCX	CCC	73	1	-	0/9/10/12	-
1	KCX	DDD	73	1	-	0/9/10/12	-
1	KCX	AAA	73	1	-	0/9/10/12	-
1	KCX	BBB	73	1	-	0/9/10/12	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

There are no torsion outliers.

There are no ring outliers.

No monomer is involved in short contacts.

5.5 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

5.6 Ligand geometry [i](#)

Of 11 ligands modelled in this entry, 7 are monoatomic - leaving 4 for Mogul analysis.

In the following table, the Counts columns list the number of bonds (or angles) for which Mogul statistics could be retrieved, the number of bonds (or angles) that are observed in the model and the number of bonds (or angles) that are defined in the Chemical Component Dictionary. The Link column lists molecule types, if any, to which the group is linked. The Z score for a bond length (or angle) is the number of standard deviations the observed value is removed from the expected value. A bond length (or angle) with $|Z| > 2$ is considered an outlier worth inspection. RMSZ is the root-mean-square of all Z scores of the bond lengths (or angles).

Mol	Type	Chain	Res	Link	Bond lengths			Bond angles		
					Counts	RMSZ	# Z > 2	Counts	RMSZ	# Z > 2
2	1BO	BBB	301	-	4,4,4	0.31	0	3,3,3	0.35	0
2	1BO	AAA	301	-	4,4,4	0.22	0	3,3,3	0.41	0
2	1BO	DDD	301	-	4,4,4	0.18	0	3,3,3	0.08	0
2	1BO	AAA	302	-	4,4,4	0.27	0	3,3,3	0.23	0

In the following table, the Chirals column lists the number of chiral outliers, the number of chiral centers analysed, the number of these observed in the model and the number defined in the Chemical Component Dictionary. Similar counts are reported in the Torsion and Rings columns. '-' means no outliers of that kind were identified.

Mol	Type	Chain	Res	Link	Chirals	Torsions	Rings
2	1BO	BBB	301	-	-	0/2/2/2	-
2	1BO	AAA	301	-	-	1/2/2/2	-
2	1BO	DDD	301	-	-	0/2/2/2	-
2	1BO	AAA	302	-	-	0/2/2/2	-

There are no bond length outliers.

There are no bond angle outliers.

There are no chirality outliers.

All (1) torsion outliers are listed below:

Mol	Chain	Res	Type	Atoms
2	AAA	301	1BO	C2-C3-C4-OH

There are no ring outliers.

1 monomer is involved in 1 short contact:

Mol	Chain	Res	Type	Clashes	Symm-Clashes
2	AAA	301	1BO	1	0

5.7 Other polymers [i](#)

There are no such residues in this entry.

5.8 Polymer linkage issues [i](#)

There are no chain breaks in this entry.

6 Fit of model and data

6.1 Protein, DNA and RNA chains

In the following table, the column labelled ‘#RSRZ > 2’ contains the number (and percentage) of RSRZ outliers, followed by percent RSRZ outliers for the chain as percentile scores relative to all X-ray entries and entries of similar resolution. The OWAB column contains the minimum, median, 95th percentile and maximum values of the occupancy-weighted average B-factor per residue. The column labelled ‘Q < 0.9’ lists the number of (and percentage) of residues with an average occupancy less than 0.9.

Mol	Chain	Analysed	<RSRZ>	#RSRZ>2	OWAB(Å ²)	Q<0.9
1	AAA	243/260 (93%)	-0.50	2 (0%) 82 85	7, 18, 35, 63	5 (2%)
1	BBB	243/260 (93%)	-0.45	4 (1%) 70 73	7, 17, 41, 70	5 (2%)
1	CCC	242/260 (93%)	-0.26	10 (4%) 42 44	10, 18, 41, 78	6 (2%)
1	DDD	243/260 (93%)	-0.13	12 (4%) 36 38	8, 19, 45, 101	8 (3%)
All	All	971/1040 (93%)	-0.34	28 (2%) 54 57	7, 18, 42, 101	24 (2%)

All (28) RSRZ outliers are listed below:

Mol	Chain	Res	Type	RSRZ
1	CCC	244	SER	8.7
1	DDD	243	THR	7.9
1	DDD	242	PRO	7.5
1	DDD	247	LEU	7.4
1	DDD	244	SER	7.0
1	CCC	245	ASP	6.4
1	CCC	247	LEU	5.8
1	CCC	23[A]	LYS	5.0
1	CCC	242	PRO	4.2
1	DDD	25	TRP	3.8
1	DDD	246	GLY	3.6
1	CCC	246	GLY	3.6
1	BBB	22	GLY	3.5
1	CCC	25	TRP	3.4
1	BBB	246	GLY	3.3
1	CCC	243	THR	3.3
1	BBB	247	LEU	3.1
1	DDD	245	ASP	2.9
1	AAA	22	GLY	2.9
1	DDD	24	GLU	2.8
1	AAA	247	LEU	2.8

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Mol	Chain	Res	Type	RSRZ
1	DDD	23	LYS	2.7
1	CCC	241	MET	2.6
1	DDD	241	MET	2.5
1	DDD	182	HIS	2.3
1	DDD	95	TRP	2.3
1	CCC	24	GLU	2.3
1	BBB	245	ASP	2.0

6.2 Non-standard residues in protein, DNA, RNA chains [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
1	KCX	AAA	73	12/13	0.95	0.06	11,15,20,20	8
1	KCX	BBB	73	12/13	0.95	0.07	12,14,23,25	9
1	KCX	DDD	73	12/13	0.95	0.07	15,20,23,25	1
1	KCX	CCC	73	12/13	0.96	0.06	15,19,21,23	1

6.3 Carbohydrates [i](#)

There are no oligosaccharides in this entry.

6.4 Ligands [i](#)

In the following table, the Atoms column lists the number of modelled atoms in the group and the number defined in the chemical component dictionary. The B-factors column lists the minimum, median, 95th percentile and maximum values of B factors of atoms in the group. The column labelled 'Q< 0.9' lists the number of atoms with occupancy less than 0.9.

Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors(Å ²)	Q<0.9
2	1BO	AAA	302	5/5	0.75	0.24	25,27,28,29	15
2	1BO	DDD	301	5/5	0.78	0.26	29,31,34,35	15
2	1BO	BBB	301	5/5	0.83	0.16	31,35,37,37	0
2	1BO	AAA	301	5/5	0.84	0.14	29,30,30,32	15
3	BR	BBB	304	1/1	0.87	0.12	42,42,42,42	1
3	BR	BBB	303[B]	1/1	0.92	0.12	33,33,33,33	1
3	BR	BBB	303[A]	1/1	0.92	0.12	37,37,37,37	1

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Mol	Type	Chain	Res	Atoms	RSCC	RSR	B-factors($\text{\AA}^2$)	Q<0.9
3	BR	AAA	304[B]	1/1	0.93	0.15	34,34,34,34	1
3	BR	AAA	304[A]	1/1	0.93	0.15	42,42,42,42	1
3	BR	BBB	302	1/1	0.99	0.03	21,21,21,21	0
3	BR	AAA	303	1/1	0.99	0.03	23,23,23,23	0

6.5 Other polymers [i](#)

There are no such residues in this entry.